Philadelphia University
Faculty of Engineering
Mechanical Engineering Department
First semester, 2010/2011

Course Syllabus

Course Title: Fluid Mechanics (1)	**Course code: 620331**
Course Level: 3	**Course prerequisite :** *Dynamics & Engineering Analysis I (620212, 630201)*
Lecture Time: 9:10 -10:00 (Sun, Tue ,Thu)	**Credit hours: 3**

Academic Staff Specifics

Name	Rank	Office Location and Number	Office Hours	E-mail Address
Dr. Munzer Ebaid	**Assistant Professor**	**Mechanical Eng Building, E61311**	**(10.10-11:10) Sun, Tues**	**mebaid@philadelphia.edu.jo**

Course description

To make the students develop and enhance the knowledge and awareness of fluid mechanics and its applications in practice. The students will be introduced to fluid properties and hydrostatics forces and learn to link the concepts and applications of Bernoulli's & Euler's to flowing fluids, the concept of control volume approach including the principles and applications of continuity, momentum, energy. Also, The study the concept of dimensional analysis and its importance for analyzing model studies and for correlating the results of experimental research to their everyday world and previously learned concepts will be introduced. However, the students should have background knowledge in statics and calculus.

Course objectives

Upon completion of this course the student should be able to understand the following:

- Fluid Properties.
- Fluid Statics on Plane and Curved Surfaces. Concept of buoyancy, Stability of Immersed and Floating Bodies.
- One-Dimensional Continuity, Bernoulli's and Euler's Equations and its applications.
- Impulse & Momentum Principles and its applications.
- Energy Equations and its applications.
- The Concept of Dimensional Analysais and Similitude.

Course components

- ***Books (title , author (s), publisher, year of publication)***
  Engineering Fluid Mechanics, 8th edition, C.T. Crowe, D.F. Elger, and J.A. Roberson, John Wiley & Sons, Inc. 2005.

- ***Support material (s)***
  Power point presentations ,video related to each section and collected notes from different sources.

- ***Study guide***
  Lectures and solving problems and home works in classroom.

- ***Homework and laboratory guide (s) if (applicable).***
  Fluid Properties: Density & Surface Tension Center of Pressure on a Submerged Plane Surface Impact of a Jet of Water Fluid Meters in Incompressible Flow Pipe Flow Pressure Distribution about a Circular Cylinder Drag Force Determination.

Teaching methods

Lectures, discussion groups, tutorials, and problem solving,

Learning outcomes

- ***Knowledge and understanding***
  Extending the student's knowledge of concepts of fluid mechanics and its application in practice, and learning the analysis and problem solving pertinent to the mechanics of fluid flow.
- ***Cognitive skills (thinking and analysis)***
  The students should link the scientific concepts they are learning with real applications by giving live examples where the subject concepts are applied.
- ***Communication skills (personal and academic)***
  Students gain a lot of information by searching through the internet and references and from local firms in order to solve problems relevant to this course.
- ***Practical and subject specific skills (Transferable Skills)***
  The knowledge of fluid mechanics is of practical importance for engineers who wish to be specialized in thermo-fluid sciences and is of importance also for industry and other advanced courses. To teach the student the basic concepts of fluid mechanics in order to go forward in under standing other advanced topics in mechanical engineering.

Assessment instruments

- Short reports and/ or presentations, and/ or Short research projects.
- Quizzes.
- Assignments.
- Final examination: 50 marks

Allocation of Marks	
Assessment Instruments	**Mark**
First examination	**15**
Second examination	**15**
Final examination: 50 marks	**50**
Reports- projects- Quizzes- Homework	**20**
Total	**100**

Documentation and academic honesty

- ***Documentation style (with illustrative examples)***
  The students will be given the key solution after each exam to compare with their answers. If any student has a query then the supervisor should consider it based on the key solution and the marking scheme.

- ***Avoiding plagiarism.***
  The university has strict rules about plagiarism, and it will be put into effect where it is seen to be necessary.

Course/ academic calendar

- Fluid Properties.
- Fluid Statics on Plane and Curved Surfaces. Concept of buoyancy, Stability of Immersed and Floating Bodies.
- One-Dimensional Continuity, Bernoulli's and Euler's Equations and its Applications.
- Impulse & Momentum Principles and its Applications.
- Energy Equations and its Applications.
- The Concept of Dimensional Analysais and Similitude.

Week	Basic and support material to be covered	Homework/reports and their due dates
(1)	Introduction and Fluid Properties	**Quiz at the end of the chapter and homework**
(2)	Introduction and Fluid Properties	
(3)	Fluid Statics	**Quiz at the end of the chapter and homework**
(4)	Flow Statics	
(5)	Continuity, Bernoulli's and Euler's Equations	
(6)	**First examination**	

(7)	Continuity, Bernoulli's and Euler's Equations	**Quiz at the end of the chapter and homework**
(8)	Continuity, Bernoulli's and Euler's Equations	
(9)	Impulse & Momentum Principales	**Quiz at the end of the chapter and homework**
(10)	Impulse & Momentum Principales	
(11)	Energy Equations	
(12)	**Second examination**	
(13)	Energy Equations	**Quiz at the end of the chapter and homework**
(14)	Dimensional Analysais	**Quiz at the end of the chapter and homework**
(15)	Dimensionnal Analysis	
(16)	**Final Examination**	

Expected workload

On average students need to spend 2 hours of study and preparation for each 50-minute lecture/tutorial.

Attendance policy

Absence from lectures and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.

References

Books

1. "Engineering Fluid Mechanics", by C.T. Crowe, D.F. Elger, and J.A. Roberson, John Wiley & Sons, Inc.
2. "Introduction to Fluid Mechanics", by R. Fox & A. McDonald, Wiley.
3. "Fluid Mechanics with Engineering Applications", by R. Daugherty, J. Franzini and E. Finnmore, McGraw-Hill.
4. "Fluid Mechanics", by F. White, McGraw-Hill.
5. "Fluid Mechanics", by P. Kundu, Academic Press.
6. "Mechanics of Fluids", by I. Shames, McGraw-Hill.
7. "Mechanics of Fluids", by M. Potter & D. Wiggert, Prentice-Hall.

8. "Fundamentals of Fluid Mechanics", by P. Gerhart, R. Gross & J. Hochstein, Addison Wesley.
9. "Elementary Fluid Mechanics" by J. Vennard & R. Street, Wiley.
10. "Mechanics of Fluids", by B.S.Massey.
11. "Fundamentals of Fluid Mechanics", by, B.R. Munson, D.F. Young & T.H. Okiishi, , John Wiley & Sons.